

AP[®] BIOLOGY
2005 SCORING GUIDELINES (Form B)

Question 4

Part (a) (3 points maximum)

- Orientation of axes, labels, scales, units.
- Data points (one mistake permitted) and line drawn.
- Determine molar concentration of potato cells. (Note: This point must be read from graph. It should fall into the range of 0.25 to 0.4 M.)

Part (b) (4 points maximum)

Components of water potential (1 point maximum)

- Pressure potential AND solute/osmotic potential/ ($\psi = \psi_p + \psi_s$)

Importance of water potential/as related to water movement (3 points maximum)

- Ensures water moves into plant root.
- Helps movement of water within plant.
- Factor involved in transpiration.
- Cell wall allows for increased pressure (turgor pressure).
- Pressure might counteract osmolarity.

Part (c) (4 points maximum)

	Prediction	Explanation	
0.0 M	Gain water/mass Swell/burst/lyse	<ul style="list-style-type: none"> • Cell is hypertonic to sucrose solution. • Sucrose solution is hypotonic to cell. • Water potential is greater in 0.0 M environment. • No cell wall. • Cell moving toward equilibrium (isotonic). 	2 points maximum
1.0 M	Lose water/mass Shrivel/crenate	<ul style="list-style-type: none"> • Cell is hypotonic to sucrose solution. • Sucrose solution is hypertonic to cell. • Water potential is greater inside animal cell. • Cell moving toward equilibrium (isotonic). 	2 points maximum